

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

| | | |
|---|--|--|
| Applicant's or agent's file reference 100004101WO01 | FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below. | |
| International application No. PCT/JP2005/011001 | International filing date (day/month/year) 09/06/2005 | (Earliest) Priority Date (day/month/year) 11/06/2004 |
| Applicant CANON KABUSHIKI KAISHA | | |

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 05 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. Certain claims were found unsearchable (See Box II).

3. Unity of invention is lacking (see Box III).

4. With regard to the title,

the text is approved as submitted by the applicant.

the text has been established by this Authority to read as follows:

5. With regard to the abstract,

the text is approved as submitted by the applicant.

the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

- a. the figure of the drawings to be published with the abstract is Figure No. _____

as suggested by the applicant.

as selected by this Authority, because the applicant failed to suggest a figure.

as selected by this Authority, because this figure better characterizes the invention.

- b. none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/JP2005/011001

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 G03G9/097 C08G63/688 C08G63/685

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 IPC 7 G03G C08G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|------------|--|-----------------------|
| A | EP 1 254 918 A (CANON KABUSHIKI KAISHA) 6 November 2002 (2002-11-06) page 5, paragraph 19; claims 21-30 page 22, paragraph 37 - page 25, paragraph 48 | 1-10 |
| A | EP 1 253 162 A (CANON KABUSHIKI KAISHA) 30 October 2002 (2002-10-30) page 21, paragraph 68 - page 22, paragraph 77; claims 20-30 | 1-10 |
| A | EP 1 253 161 A (CANON KABUSHIKI KAISHA) 30 October 2002 (2002-10-30) claims 22-32 | 1-10 |
| A | EP 1 236 755 A (CANON KABUSHIKI KAISHA) 4 September 2002 (2002-09-04) claims 48-56 | 1-10 |
| | | -/- |

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

5 September 2005

Date of mailing of the international search report

14/09/2005

Name and mailing address of the ISA
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Authorized officer

Masson, P

INTERNATIONAL SEARCH REPORT

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| International Application No PCT/JP2005/011001 |
|---|

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|----------|--|-----------------------|
| A | EP 1 336 635 A (CANON KABUSHIKI KAISHA) 20 August 2003 (2003-08-20) page 11, line 45 - page 12, line 31 claims 14-27 | 1-10 |
| A | EP 1 245 605 A (CANON KABUSHIKI KAISHA) 2 October 2002 (2002-10-02) claims 29-40 | 1-10 |
| A | WO 2004/038512 A (CANON KABUSHIKI KAISHA; MIHARA, CHIEKO; YANO, TETSUYA; KOZAKI, SHINYA;) 6 May 2004 (2004-05-06) claims | 1-10 |
| A | WO 2004/037889 A (CANON KK 'JP!; FUKUI TATSUKI 'JP!; YANO TETSUYA 'JP!; MIHARA CHIEKO 'J) 6 May 2004 (2004-05-06) claims 24-27 claims 37-40 | 1-10 |
| A | EP 1 340 777 A (CANON KABUSHIKI KAISHA) 3 September 2003 (2003-09-03) claims 34-61 | 1-10 |
| P,A | WO 2004/061530 A (CANON KABUSHIKI KAISHA; MIHARA, CHIEKO; YANO, TETSUYA; KOZAKI, SHINYA;) 22 July 2004 (2004-07-22) the whole document | 1-10 |
| P,A | WO 2004/061529 A (CANON KABUSHIKI KAISHA; FUKUI, TATSUKI; YANO, TETSUYA; MIHARA, CHIEKO;) 22 July 2004 (2004-07-22) the whole document | 1-10 |
| A | CAMMAS S ET AL: "Polymers of malic acid and 3-alkylmalic acid as synthetic PHAs in the design of biocompatible hydrolyzable devices" INTERNATIONAL JOURNAL OF BIOLOGICAL MACROMOLECULES, BUTTERWORTH & CO., GUILDFORD, GB, vol. 25, 1999, pages 273-282, XP002339169 ISSN: 0141-8130 scheme 2 abstract | 5 |
| A | YAMAKOA T ET AL: "Synthesis and properties of malic acid-containing functional polymers" INTERNATIONAL JOURNAL OF BIOLOGICAL MACROMOLECULES, BUTTERWORTH & CO., GUILDFORD, GB, vol. 25, 1999, pages 265-271, XP002339172 ISSN: 0141-8130 equation 2 | 5 |

INTERNATIONAL SEARCH REPORT

International Application No
PCT/JP2005/011001

| C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT | | |
|--|---|-----------------------|
| Category * | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| A | TROLLSAS M ET AL: "HYDROPHILIC ALIPHATIC POLYESTERS: DESIGN, SYNTHESIS, AND RING-OPENING POLYMERIZATION OF FUNCTIONAL CYCLIC ESTERS" MACROMOLECULES, AMERICAN CHEMICAL SOCIETY. EASTON, US, vol. 33, no. 13, 27 June 2000 (2000-06-27), pages 4619-4627, XP000950237 ISSN: 0024-9297 scheme 4figures 4,5 | 5 |

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP2005/011001

| Patent document cited in search report | Publication date | Patent family member(s) | | | Publication date |
|--|------------------|----------------------------|---|--|--|
| EP 1254918 | A 06-11-2002 | DE DE EP JP US | 60200306 D1 60200306 T2 1254918 A2 2003048968 A 2003073804 A1 | | 06-05-2004 17-02-2005 06-11-2002 21-02-2003 17-04-2003 |
| EP 1253162 | A 30-10-2002 | EP JP US | 1253162 A2 2003034716 A 2003100700 A1 | | 30-10-2002 07-02-2003 29-05-2003 |
| EP 1253161 | A 30-10-2002 | EP JP US | 1253161 A2 2003034717 A 2003104300 A1 | | 30-10-2002 07-02-2003 05-06-2003 |
| EP 1236755 | A 04-09-2002 | EP JP JP US | 1236755 A2 3592306 B2 2003306534 A 2003013841 A1 | | 04-09-2002 24-11-2004 31-10-2003 16-01-2003 |
| EP 1336635 | A 20-08-2003 | JP CN EP US | 2004197063 A 1446835 A 1336635 A1 2004081906 A1 | | 15-07-2004 08-10-2003 20-08-2003 29-04-2004 |
| EP 1245605 | A 02-10-2002 | EP JP US | 1245605 A2 2003012786 A 2003096182 A1 | | 02-10-2002 15-01-2003 22-05-2003 |
| WO 2004038512 | A 06-05-2004 | AU WO JP | 2003274744 A1 2004038512 A1 2004163928 A | | 13-05-2004 06-05-2004 10-06-2004 |
| WO 2004037889 | A 06-05-2004 | JP AU WO | 2004315782 A 2003275603 A1 2004037889 A1 | | 11-11-2004 13-05-2004 06-05-2004 |
| EP 1340777 | A 03-09-2003 | JP JP CN EP US | 3639831 B2 2004002686 A 1440991 A 1340777 A1 2004005290 A1 | | 20-04-2005 08-01-2004 10-09-2003 03-09-2003 08-01-2004 |
| WO 2004061530 | A 22-07-2004 | JP AU WO | 2005154699 A 2003295241 A1 2004061530 A1 | | 16-06-2005 29-07-2004 22-07-2004 |
| WO 2004061529 | A 22-07-2004 | JP AU WO | 2005154698 A 2003295238 A1 2004061529 A1 | | 16-06-2005 29-07-2004 22-07-2004 |

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**
(PCT Rule 43bis.1)

| | | | |
|--|--|---|--|
| <p>Applicant's or agent's file reference see form PCT/ISA/220</p> | | <p>Date of mailing (day/month/year) see form PCT/ISA/210 (second sheet)</p> | |
| <p>International application No. PCT/JP2005/011001</p> | | <p>International filing date (day/month/year) 09.06.2005</p> | |
| <p>Priority date (day/month/year) 11.06.2004</p> | | | |
| <p>International Patent Classification (IPC) or both national classification and IPC G03G9/097, C08G63/688, C08G63/685</p> | | | |
| <p>Applicant CANON KABUSHIKI KAISHA</p> | | | |

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion.
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2005/011001

Box No. I Basis of the opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - a sequence listing
 - table(s) related to the sequence listing
 - b. format of material:
 - in written format
 - in computer readable form
 - c. time of filing/furnishing:
 - contained in the international application as filed.
 - filed together with the international application in computer readable form.
 - furnished subsequently to this Authority for the purposes of search.
3. In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/JP2005/011001

**Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or
Industrial applicability; citations and explanations supporting such statement**

1. Statement

| | | | |
|-------------------------------|------|--------|------|
| Novelty (N) | Yes: | Claims | 1-10 |
| | No: | Claims | |
| Inventive step (IS) | Yes: | Claims | 1-10 |
| | No: | Claims | |
| Industrial applicability (IA) | Yes: | Claims | 1-10 |
| | No: | Claims | |

2. Citations and explanations

see separate sheet

Box No. VI Certain documents cited

1. Certain published documents (Rules 43bis.1 and 70.10)
and /or
2. Non-written disclosures (Rules 43bis.1 and 70.9)

see form 210

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

Box No. VIII Certain observations on the International application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/JP2005/011001

Cf V:

Reference is made to the following documents:

- D1: EP-A-1 254 918 (CANON KABUSHIKI KAISHA) 6 November 2002 (2002-11-06)
- D2: EP-A-1 253 162 (CANON KABUSHIKI KAISHA) 30 October 2002 (2002-10-30)
- D3: EP-A-1 253 161 (CANON KABUSHIKI KAISHA) 30 October 2002 (2002-10-30)
- D4: EP-A-1 236 755 (CANON KABUSHIKI KAISHA) 4 September 2002 (2002-09-04)
- D5: EP-A-1 336 635 (CANON KABUSHIKI KAISHA) 20 August 2003 (2003-08-20)
- D6: EP-A-1 245 605 (CANON KABUSHIKI KAISHA) 2 October 2002 (2002-10-02)
- D7: WO 2004/038512 A (CANON KABUSHIKI KAISHA; MIHARA, CHIEKO; YANO, TETSUYA; KOZAKI, SHINYA;) 6 May 2004 (2004-05-06)
- D8: WO 2004/037889 A (CANON KK [JP]; FUKUI TATSUKI [JP]; YANO TETSUYA [JP]; MIHARA CHIEKO [J] 6 May 2004 (2004-05-06)
- D9: EP-A-1 340 777 (CANON KABUSHIKI KAISHA) 3 September 2003 (2003-09-03)
- D10: WO 2004/061530 A (CANON KABUSHIKI KAISHA; MIHARA, CHIEKO; YANO, TETSUYA; KOZAKI, SHINYA;) 22 July 2004 (2004-07-22)
- D11: WO 2004/061529 A (CANON KABUSHIKI KAISHA; FUKUI, TATSUKI; YANO, TETSUYA; MIHARA, CHIEKO;) 22 July 2004 (2004-07-22)
- D12: CAMMAS S ET AL: "Polymers of malic acid and 3-alkylmalic acid as synthetic PHAs in the design of biocompatible hydrolyzable devices" INTERNATIONAL JOURNAL OF BIOLOGICAL MACROMOLECULES, BUTTERWORTH & CO., GUILDFORD, GB, vol. 25, 1999, pages 273-282, XP002339169 ISSN: 0141-8130
- D13: YAMAKOA T ET AL: "Synthesis and properties of malic acid-containing functional polymers" INTERNATIONAL JOURNAL OF BIOLOGICAL MACROMOLECULES, BUTTERWORTH & CO., GUILDFORD, GB, vol. 25, 1999, pages 265-271, XP002339172 ISSN: 0141-8130
- D14: TROLLSAS M ET AL: "HYDROPHILIC ALIPHATIC POLYESTERS: DESIGN, SYNTHESIS, AND RING-OPENING POLYMERIZATION OF FUNCTIONAL CYCLIC ESTERS" MACROMOLECULES, AMERICAN CHEMICAL SOCIETY. EASTON, US, vol. 33, no. 13, 27 June 2000 (2000-

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.
PCT/JP2005/011001

06-27), pages 4619-4627, XP000950237 ISSN: 0024-9297

Cf V:

Article 33(2) PCT:

Claim 1:

None of the documents discloses the same combination of features as disclosed in **claim 1**.

Thus, the subject matter of **claim 1** meets the requirements of Article 33(2) PCT.

The same remark applies also to **claims 8,9 and 10**.

Claim 5:

None of the documents discloses the same combination of features as disclosed in **claim 5**

Thus, the subject matter of **claim 5** meets the requirements of Article 33(2) PCT.

Article 33(3) PCT:

Document D7 represents the closest prior art. The difference between **D7 and claim 5** is that in **claim 5**, the carboxylic acid (or salt thereof) is directly bonded to the polymer backbone whereas in **D7**, there is at least a methylene group between the carboxylic group and the polymer backbone. Since there are no comparative examples in accordance with **D7**, the objective technical problem is to provide further charge control agents based on functionalised PHA which have a good chargeability and a good stability with time.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/JP2005/011001

Since in all the **documents D1 to D9**, there are no indications to specifically have a direct link between the carboxylic acid and the backbone in PHAs and since in **D12 to D14**, the polymers in accordance with formula (5) of claim 5 are used for medical applications, there are no indications to modify the formula of **compounds of D7**.

Thus, the subject matter of **claim 5** meets the requirements of Article 33(3) PCT.

The same reasoning applies also to **claim 1** (starting either from D7 or from D5).

Thus, the subject matter of **claim 1** meets the requirements of Article 33(3) PCT.

The same remark applies also to **claims 8,9 and 10**.

Article 33(4) PCT:

The subject matter of **all claims** is capable of industrial applicability.

Cf VI:

Published documents under Rule 70.10 PCT:

WO-A-2004/061530:

Publication date: 22.07.2004

Filing date: 26.12.2003

Priority date: 27.12.2002

WO-A-2004/061529

Publication date: 22.07.2004

Filing date: 26.12.2003

Priority date: 27.12.2002

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/JP2005/011001

Cf VII:

In page 50 (lines 6 to 10), n is not present in the formula (23).

In figure 7, the reference sign 41 is not explained and should be deleted. The same remark applies also to reference signs H, 6, and 10 in figure 1, 13, 15,16,18,A,B, and 17 in figure 2, and the reference signs in figures 5 and 6.

In tables 1 and 4, it is not clear if the results concerning the chargeability concern the toner or the corresponding double component.

Cf VIII:

Article 6 PCT:

In claims 1 and 5 the definition of the formula of the polyhydroxyalkanoate (PHA) is not clear since the specifications regarding I,m,Z_{1a}, Z_{1b} and their equivalents **in claim 5** are defined only by means of provisos. Thus, it is not clear what are the real ranges for I and m and the entire definition of Z_{1a}, Z_{1b} and their equivalents **in claim 5**. Thus one cannot define the scope of protection of these claims.

Claims 2 to 4 and 6 to 7 are not supported by the description.